**Electric Charges \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_**

**Station 5**

Everything is this world is made up of atoms. All atoms consist of protons, electrons and neutrons. Unlike protons and neutrons that reside in the nucleus, electrons are able to move around. An object with a surplus of electrons is negatively charged, while an object with a surplus of protons is positively charged.

1. **Charging by Friction**

When we rub two different materials together, this process is known as charging by friction. Since the objects are made of different materials, their atoms will hold on to the electrons with different strengths.

1. Use the following chart to answer the questions below:

Sulphur

Brass

Copper

Ebonite

Increasing tendency to hold on to electrons

(negatively-charged)

Increasing tendency to lose electrons

(positively-charged)

Paraffin Wax

Silk

Lead

Fur

Wool

Glass

Explain what happens:

a) When you rub an ebonite rod with fur.

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b) When you rub a glass rod with silk.

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1. When you rub brass with wool.

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1. **Charging by Conduction**

Conduction describes the process in which two objects come into contact. We will use an **electroscope** to demonstrate charging by conduction. An electroscope is a scientific instrument that detects the presence and magnitude of charges.

1. When the gold leaves are down, the electroscope is neutral. How many electrons compared to protons are in this electroscope? MORE EQUAL LESS
2. Rub the ebonite rod with fur. In the boxes below, draw what your gold leaves look like and show the distribution of charges in your diagrams:

**B**

**A**

When the ebonite rod moves away from the metal knob.

When the ebonite rod touches the metal knob.

1. **Charging by Induction**

Charging by induction describes the process of charging any object without physical contact.

1. Rub the ebonite rod with fur. In the boxes below, draw what your gold leaves look like and show the distribution of charges:

**E**

When the ebonite rod is removed from the electroscope.

When one person touches the metal knob and the ebonite rod is brought close to the electroscope.

**C**

When the finger is removed but the ebonite rod is still close to the electroscope

**D**

1. **Explanation**

Using a separate piece of paper, explain why the electroscope behaved the way for Diagrams A-E.